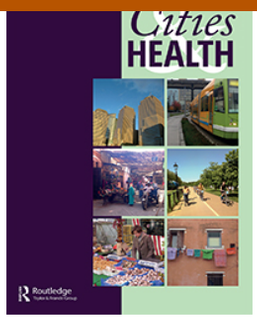

Cities & Health

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rcah20

COVID-19 reveals the systemic nature of urban health globally

Franz Gatzweiler , Bojie Fu , Celine Rozenblat , Huey-Jen Jenny Su , Isaac Luginaah , Jason Corburn , Jo Ivey Boufford , Juan Vela Valdes , Blaise Nguendo-Yongsi , Philippa Howden-Chapman , R. B. Singh , Rachel Cooper , Tolullah Oni & Yong-Guan Zhu

To cite this article: Franz Gatzweiler , Bojie Fu , Celine Rozenblat , Huey-Jen Jenny Su , Isaac Luginaah , Jason Corburn , Jo Ivey Boufford , Juan Vela Valdes , Blaise Nguendo-Yongsi , Philippa Howden-Chapman , R. B. Singh , Rachel Cooper , Tolullah Oni & Yong-Guan Zhu (2020): COVID-19 reveals the systemic nature of urban health globally, Cities & Health, DOI: 10.1080/23748834.2020.1763761

To link to this article: https://doi.org/10.1080/23748834.2020.1763761

Published online: 24 Jul 2020.

CITIES & HEALTH
https://doi.org/10.1080/23748834.2020.1763761

COMMENTRY AND DEBATE

COVID-19 reveals the systemic nature of urban health globally

Franz Gatzweiler[a], Bojie Fu[b], Celine Rozenblat[c], Huey-Jen Jenny Su[d], Isaac Luginaah[e], Jason Corburn[f], Jo Ivey Boufford[g], Juan Vela Valdes[h], Blaise Nguendo-Yongsi[i], Philippa Howden-Chapman[j], R. B. Singh[k], Rachel Cooper[l], Tolullah Oni[m] and Yong-Guan Zhu[n]

[a]Institute of Urban Environment, Xiamen, China; [b]State Key Lab of Urban and Regional Ecology, Research Center for Eco-environmental Sciences, Chinese Academy of Sciences, Beijing, China; [c]Universite de Lausanne Faculte des Geosciences et de l'environnement; [d]Department of Environmental and Occupational Health, College of Medicine, National Cheng Kung University, Tainan City, Taiwan; [e]Department of Geography, Social Science Centre, Western University, London, Ontario, Canada; [f]College Of Environmental Design, University of California, Berkeley, CA, USA; [g]New York University School of Global Public Health, New York City, USA; [h]National School of Public Health, University of Medical Sciences of Habana, Habana, Cuba; [i]School of Health Sciences, Catholic University of Central Africa, Yaoundé, Cameroon; [j]Department of Public Health, University of Otago, Otago, New Zealand; [k]Department of Geography, Delhi School of Economics, University of Delhi, Delhi, India; [l]Lancaster Institute for the Contemporary Arts, Lancaster University, Lancaster, UK; [m]MRC Epidemiology Unit, University of Cambridge, Cambridge, UK; [n]Institute of Urban Environment, Chinese Academy of Sciences, Xiamen, China

ABSTRACT
Statement by the scientific committee* of the International Science Council's Programme on Urban Health and Wellbeing, on critical elements of urban health action in response to the epidemic.

ARTICLE HISTORY
Received 23 April 2020
Accepted 24 April 2020

KEYWORDS
COVID-19; urban health; systemic disease

An approach to emergency response that takes advantage of the scale of urban systems, could have mitigated some of the disastrous impacts of the COVID-19 outbreak. We consider what cities can learn from one another about containing a pandemic and how principles for urban health in the Xiamen Call for Action (Ebikeme *et al.* 2019) can be applied to help cities better prepare for and mitigate the impacts of future outbreaks.

Urban health refers to the health of people living in cities and the healthy functioning of cities. This includes how they are managed, planned and built as urban (eco) systems to provide a range of goods and services to their populations. It is determined by the interplay of people and their social, built and natural environments. People and cities work symbiotically. Principles for sustainable urban development can be developed that promote the health and wellbeing of people. Urban residents are active participants in the management and delivery of essential goods and services. They can contribute to ensure development supports the health of all population groups and communities.

In 2018, 55% of the world's population lived in urban areas and by 2050 this is expected to increase to nearly 70%. Cities are the places with highest population densities and throughout history, cities have been the sites of infectious disease outbreaks (Jones 2020), and outbreaks in cities present unique challenges, as was evident in Ebola, SARS, MERS and now Covid-19. However, cities are also the sites of solutions to arrest the spread of infectious diseases and improve population health. Yet, how effectively and equitably a city is managed as a system, is a critical factor for whether and how epidemics like COVID-19 will spread, and which urban populations will be the most affected.

Despite there being an overall decline in infectious diseases, the typical infectious diseases of density and poverty, show marked inequalities in who is vulnerable, even in developed countries and within cities (Baker *et al.* 2012). There has been an overall decline in deaths from infectious diseases over the last decades. These declines may be largely attributable to advances in sanitation and living conditions, and in biomedicine, especially the availability of antibiotics and vaccines. But there are currently no anti-viral medicines to treat COVID-19.

There is also a strong causal relationship between overcrowded, poor quality housing and settlements and the incidence and prevalence of infectious diseases, which should not be overlooked (WHO 2018). With continuing population growth there is a huge urban infrastructure financing gap for housing, clean water, green and recreational space, and sanitation, exceeding 1 trillion USD/year (Ebikeme *et al.* 2019).

For instance, the number of urban slum dwellers has reached 881 million today and is expected to reach 2 billion in 2030 (WUC 2020). Cities, especially those in low- and middle-income countries, do not have adequate resources to provide the goods and services necessary for building and maintaining the social and physical infrastructure needed to support health and well-being. Without

CONTACT Franz Gatzweiler gatzweiler02@gmail.com Institute of Urban Environment, Xiamen, China

on-going sustainable urban management and infrastructure development, urban health advantages are at risk of being lost. As the current COVID-19 outbreak clearly demonstrates, the health of cities is the backbone of global health but also at the heart of sustainable development.

The current global outbreak of the novel coronavirus COVID-19 was first officially reported on December 31st, 2019 in the city of Wuhan, Hubei Province, China and spread quickly to other cities throughout China and the world. It is no coincidence that a city was the origin of its spread. Peter Daszak (NYT 2020), explains that humans made the virus by disrupting the natural environment's ecosystems.

The G20 health ministers have recently recognized COVID-19 as a systemic disease and ss such it requires a systemic response guided by principles such as outlined in the Xiamen Call for Action which has been developed in response to key features of cities, which all complex systems have in common:

(1) they can be planned, designed and built by better understanding their composition and dynamics;
(2) they are self-organising; and
(3) they have emergent properties which emerge unpredictably during which radical uncertainty prevails.[1]

Accordingly, the systems approach requires two strands of action. First, a good scientific understanding of the urban social, ecological and technological infrastructure and the urban system goods and services produced and provided. In case of an urban health emergency like COVID-19, it is key to understand all aspects of the virus's transmission paths and infectiousness. Second, a strategy for political leadership, community involvement, communication and transfer of knowledge to action must be in place. Eventually a strategy for regional, national and global action that promote and support effective local initiatives are critical to long term success.

The six principles of building systems governance for urban health of the Xiamen Call to Action (Ebikeme *et al.* 2019) include:

(1) Clear leadership and mandate to deal with urban health issues in an integrated manner.
(2) Inclusiveness: including human rights; mutually beneficial for sectors.
(3) Inter-sectorality: various urban sectors, such as transportation, energy, housing, including primary health care, work, and achieve urban health outcomes together.
(4) Health and wellbeing as performance indicators which need to be measured centrally and locally in all policies.
(5) Risk sharing: stakeholders investing in and benefiting from cross-sectorial collaboration also share the costs
(6) Pre-cautionary principle: it's about both the curative and preventive dimensions of health.

Box 1.
One of many examples of how scholars at the Centre for Global Healthy Cities, UC Berkeley (healthycities.berkeley.edu), have attempted to implement the systems approach to urban health.
Toxic stress stress' (McEwen and Bulloch 2019) is the constant worry and adverse social events that wear away and damage people's immune systems. It can be prevented and reversed through investments in core physical and social infrastructure in cities that supports health and immune systems; this can mean building and maintaining basic life-supporting infrastructure, like water, sanitation, electricity and housing as primary prevention.
Urban health with a systems approach for addressing infectious diseases/epidemics needs to include a community-based systems focus, so we know where and how to trace contacts, where and how to approach social distancing interventions while limiting undue and unintended consequences to mental and physical health, to involve those most impacted to keep information transparent, and how to support communities (economically, socially, etc.) when/if a quarantine strategy is used.
Our community-involved systems science recognizes that important variables in systems lie and interact across levels and must be integrated to better understand health outcomes and design more significant interventions. Our systems approach improves knowledge and capacity of both residents and professionals, including those in the health sector. This can be crucial when fear and mis-information spreads fast during an outbreak.

We, the Scientific Committee of the International Science Council's global science programme on Urban Health and Wellbeing, conclude that in order to respond to global health emergencies such as COVID-19, it is essential to build 'the brain of the city', as suggested in the Xiamen Call for Action 2019. Further, health needs to be put into the center of urban planning and sustainable development by taking into account:

(1) The mutually dependent relationship of people and their urban and global environments is most obvious in cities. Cities are urban systems which are globally interconnected, and the health of cities defines the health of the planet. The ways in which our cities and their hinterlands are managed, planned and built, critically determines a potential pathogen spillover and the severity of an infectious disease outbreak, long before the first emergency response actions are taken.
(2) The earliest possible emergency response critically defines the speed and severity of an outbreak

and thereby also its impact on health systems and economies. Similarly, addressing the outbreak at its specific geographical and socio-ecological origin, is paramount while fostering platforms for cities to better learn from each other. This includes better surveillance and monitoring of human pathogens in urban environments.

(3) The dynamics of cities as complex social, ecological and technological systems need to be better understood in order to adequately respond to future health emergencies. This includes mapping and modeling various aspects of infectious disease dynamics.

(4) The innovative potential of cities and the capabilities of their inhabitants need to be continuously promoted by increasing urban infrastructure financing.

(5) The human and social capital of cities and among cities worldwide has great potential of achieving a collective intelligent response, reactive and proactive, to future health emergencies.

Note

1. Despite expert knowledge and big data, it is not entirely possible to predict exactly how urban development will affect the health of a city's population and how lethal an infectious disease like the novel coronavirus, will be.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Dr. Franz Gatzweiler is professor at the Institute of Urban Environment, Chinese Academy of Sciences and Executive Director of the International Science Council's global interdisciplinary science programme on "Urban Health and Wellbeing: a Systems Approach". He studied Agricultural Economics at the University of Bonn and the Humboldt University of Berlin in Germany. His doctorate research was on the 'Economic Value of Nature'. He received grants from major German and International foundations for research on managing forest landscapes, biodiversity, poverty and marginality in Subsaharan Africa and South Asia. He is external affiliated faculty of the Ostrom Workshop.

Prof. Bojie Fu, is Academician of the Chinese Academy of Sciences and the World Academy of Sciences. He is distinguished Professor and Chair of Steering Committee of the Research Center for Eco-Environmental Sciences at the Chinese Academy of Sciences. He is a physical geographer and landscape ecologist, mainly engaged in landscape ecology and ecosystem services. He has made systematic innovation achievements in land use structure and ecological process, landscape ecology and ecosystem services, and promoted the development of landscape ecology in China. He has published over 500 articles and 12 books on ecosystem services, landscape ecology, land use, ecological restoration, and eco-hydrology.

Celine Rozenblat, is professor of Urban Geography at the University of Lausanne and president of the urban commission of the International Geographical Union (IGU). She studies the evolution urban systems inside and between cities and in the complexity of this multi-level system, how does the multi-level perspective highlight some resilience properties? The methodologies derived from complex systems sciences bring new forms of intelligibility to worldwide urban dynamics. She studies systems of cities at European and world scales, with large comparative urban data, mapping and visualizing networks.

Dr. Huey-Jen Jenny Su is currently a Distinguished Professor of Environmental Health at the National Cheng Kung University in Taiwan. Her research efforts have primarily focused on the topic of air pollution related health effects, with a particular emphasis on the rising global concerns with airborne microbial hazards. She was also an expert member of the committee that prepared the World Health Organization's report concerning guidelines for biological agents in the indoor environment. Dr. Su was honored by her alma mater with the Harvard T. H. Chan School of Public Health's 2017 Leadership Award in Public Health Practice.

Dr. Isaac Luginaah is Health/Medical Geographer in the Department of Geography, the University of Western Ontario. His research interest aims to improve our understanding of the broad determinants of population health and on environment and health linkages. He is a Member of the College of the Royal Society of Canada and a Fellow of the African Academy of Sciences.

Jason Corburn is a Professor in the Department of City and Regional Planning and School of Public Health. He directs the Institute of Urban and Regional Development and the Center for Global Healthy Cities at UC Berkeley. He also coordinates the joint Master of City Planning (MCP) and Master of Public Health (MPH) degree program at UC Berkeley. His research focuses on the links between environmental health and social justice in cities, notions of expertise in science-based policy making, and the role of local knowledge in addressing environmental and public health problems.

Jo Ivey Boufford, MD is a Clinical Professor of Global Health at New York University School of Global Public Health and Immediate Past-President of The International Society for Urban Health (ISUH).

Juan Vela Valdes Medical Doctor from University of Habana, Cuba. Bachelor of Social Sciences. Master in Medical Education. Specialist first and second degree in Organization and Management of Public Health. PhD in Health Sciences. Full Professor of Public Health at University of Medical Sciences of Habana and at National School of Public Health, Cuba. Emeritus Professor. Doctor Honoris Causa from National University of Engineering, Nicaragua, Autonomous University of Sinaloa, Mexico, University of St. Thomas, Minnesota, USA, and University of Camaguey, Cuba. Member of Board of United Nations University (UNU) 2001-2007. President of Union of Universities of Latin America and Caribbean. 2004-2006.

Prof. Blaise Nguendo-Yongsi (B.ed, Msc, PhD) is a geographer and academic, specialising in health geography. He is Professor of Urban Health at IFORD-University of Yaoundé II, and Associate Professor of Epidemiology and Biostatistics at the School of Health Sciences - Catholic University of Central Africa in Cameroon. His broad area

of research interest includes environmental health, population health and Urban health.

Philippa Howden-Chapman sesquicentennial distinguished professor of public health at the University of Otago, Wellington, New Zealand, is co-director of He Kāinga Oranga/ Housing and Health Research Programme and director of the New Zealand Centre for Sustainable Cities. She has conducted a number of randomised community housing trials in partnership with local communities, which have had a major influence on housing, health and energy policy. She was chair of the WHO Housing and Health Guideline Development Group and currently chair of the ISC Scientific Committee for Health & Wellbeing in the Changing Urban Environment: a systems approach.

Dr. R. B. Singh, is Professor since 1996 and Head Retd. in the Department of Geography, Delhi School of Economics, University of Delhi, Delhi-7, India. Earlier served as UGC Research Scientist-C/Professor (1996-2002), UGC Research Scientist-B/Reader (1988-1996) and Lecturer (1985-1988); Coordinator UGC-SAP-DRS III and Head, Department of Geography during 2013-2016 and 2019-20. Prof. Singh got elected as first Indian and second Asian secretary General and Treasurer of the International Geographical Union for 2018-22. Dr. Singh is presently Chair, Research Council, CSIR-Central Food Technological Research Institute, Mysore, Government of India. He is Member Vision India 2035, NITI Aayog, highest policy institution of India.

Rachel Cooper OBE is Distinguished Professor of Design Management and Policy at Lancaster University. Her research interests cover design management and policy across all sectors of industry, with a specific interest in design for wellbeing. She has published extensively on these topics, including books 'Designing Sustainable Cities', 'The Handbook of Wellbeing and the Environment' and 'Living in Digital Worlds'. Professor Cooper was a Lead Expert for the UK Government Foresight programme on the Future of Cities (2013-2016), was on the Academy of Medical Sciences Working group addressing 'The Health of the Public 2040' (2015-16) and is currently a Chair of the UK Prevention Research Partnership, Expert Advisory Group.

Tolullah Oni is co-lead, Global Diet and Activity Research Group, University of Cambridge; Honorary Associate Professor, University of Cape Town leading the Research Initiative for Cities Health and Equity (RICHE|Africa). A Public Health Physician and urban epidemiologist, her research supports a coordinated approach between science, policy and societal role players, identifying creative strategies to address complex urban population health challenges in rapidly growing cities globally. Profiled in the Lancet journal (2016), Science magazine (2018), and the British Medical Journal (2019), she is a Fellow of the African Academy of Sciences and a World Economic Forum Young Global Leader.

Dr. Yong-Guan Zhu,elected member of the Chinese Academy of Sciences, Professor of biogeochemistry and environmental soil science in the Institute of Urban Environment, Chinese Academy of Sciences. He is a leader in taking multi-scale and multi-disciplinary approaches to soil and environmental problems. He served as a member of Standing Advisory Group for Nuclear Application, International Atomic Energy Agency and is the recipient of many merit awards, among them TWAS Science Award for Agricultural Science 2013, National Natural Science Award 2009. Professor Zhu has published over 300 papers and was selected as a Web of Science Highly Cited Researcher (2016-2019).

ORCID

Franz Gatzweiler http://orcid.org/0000-0002-8424-3223
Celine Rozenblat http://orcid.org/0000-0002-5364-4403
Isaac Luginaah http://orcid.org/0000-0001-7858-3048
Jason Corburn http://orcid.org/0000-0002-2160-348X
Jo Ivey Boufford http://orcid.org/0000-0002-2640-8835
Philippa Howden-Chapman http://orcid.org/0000-0002-1529-6735
Rachel Cooper http://orcid.org/0000-0003-1503-1304
Tolullah Oni http://orcid.org/0000-0003-4499-1910
Yong-Guan Zhu http://orcid.org/0000-0003-3861-8482

*Authors/Members of the scientific committee in alphabetical order

References

Baker, M., *et al.*, 2012. Increasing incidence and inequalities in infectious diseases in a developed country. *The Lancet*, 379 (9821), 1112–1119. doi:10.1016/S0140-6736(11)61780-7.
Ebikeme, C. *et al.*, 2019. Xiamen call for action: building the brain of the city—universal principles of urban health. *Journal of urban health*, 96 (4), 507–509. doi:10.1007/s11524-018-00342-0.
Jones, D.S., 2020. History in a crisis — lessons for Covid-19. *New England journal of medicine*, 382 (18), 1681–1683. doi:10.1056/NEJMp2004361.
McEwen, B.S. and Bulloch, K., 2019. Epigenetic impact of the social and physical environment on brain and body. *Metabolism*, 100, 153941. doi:10.1016/j.metabol.2019.07.005

NYT (New York Times), 2020. We made the coronavirus epidemic, opinion by David Quammen. https://www.nytimes.com/2020/01/28/opinion/coronavirus-china.html

UN, 2018. https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html

WHO (World Health Organisation), 2018. Housing and health guidelines. Geneva: WHO.

WUC (World Urban Campaign), 2020. Up for Slum Dwellers. Availabe from: www.worldurbancampaign.org/psup/about-slum-dwellers [Accessed 12 March 2020].